Caltrans Photogrammetry Control Data File Format and Use

In August, 2000 Caltrans changed the file format for Photogrammetric Control. Caltrans provides mapping contractors with the control information for each individual mapping order. The new control file format uses the file extension .GPE.

Introduction

Photogrammetric Control files contain information for photo centers and control points. The new file format is a standard ASCII text file. The first three lines are informational and identify the project and survey datum. The sample file below is named *00033.GPE* for mapping project ASC # 0001-33 which is located in District 1, Lake County along State Route 29.

```
ASC# 0001-33  01-LAK-29
   HORIZONTAL   83 ZONE  2 METRIC
   VERTICAL    29 NGVD
            28 9   640195.974  1936934.100  1079.304 8A  76
            29 9   640260.120  1936635.890  1075.945 8A  76
            30 9   640320.255  1936332.385  1069.254 8A  76
            31 9   640368.947  1936038.889  1067.895 8A  76
            32 9   640416.942  1935748.963  1071.239 8A  76
            33 9   640469.644  1935463.633  1071.696 8A  76
          1010 0   637951.968  1941975.879   678.043
          1020 0   637538.409  1941617.207   642.230
          1030 0   637775.194  1941798.287   619.409
          1040 0   637830.627  1941717.223   618.194
          1101 3   637804.225  1941761.966   619.203 HV 01
          1102 3   639929.744  1936476.153   580.950 HV02
          1103 3   640264.951  1936497.219   568.860 HV03
          1113 3   637971.142  1941872.520   677.595 HV 13
          1114 3   637661.055  1941542.571   642.833 HV 14
          1138 1   637883.236  1941647.108   615.571 V 50
```

Seven Data Columns

The data is contained in 7 space delimited columns, describing one point per line. A description of each column follows:

COLUMN 1. This is a **POINT ID** record number for control points. For photo centers, this number identifies the **Exposure Number**.

COLUMN 2. This column contains the CODE number that identifies the type of control. Currently there are 6 codes numbered 0 through 4 and 9.

Code	Description	Cell Name
0	analytic control (pug point)	ATC
1	vertical field control	VC
2	horizontal field control	HC
3	full field (H & V) control	HVC
4	special (other)	C4
9	calculated photo center	PC

COLUMN 3. Contains the **Y** or Northing value.

COLUMN 4. Contains the **X** or Easting value.

COLUMN 5. Contains the **Z** or Elevation value.

COLUMN 6. This column contains the **LABEL**. The label can be a **control point name** or the **roll number** for photo centers.

COLUMN 7. The last column is a **PROBLEM NUMBER** that relates photo centers to a flight line. This column is not used or needed by the mapping contractor.

Each contractor is provided space on the Caltrans' FTP server for the purpose of exchanging data. Control files for each mapping project will be placed in the contractors "OUT" directory.

If you have any problems obtaining Caltrans control, please send email to Paul.D.Fredrickson@dot.ca.gov

Loading Control For Analytical Stereo Plotters

The Photogrammetric Control Format requires "read statements" to up-load control points to a stereo plotter. Each mapping contractor will need to customize specific instructions for their own equipment. The following information may be of help.

```
0000000001111111112222222223333333334444444445555555556666666666  COLUMN
1234567890123456789012345678901234567890123456789012345678901234567890  NUMBER
1020 0   637538.409  1941617.207   642.230
1030 0   637775.194  1941798.287   619.409
1040 0   637830.627  1941717.223   618.194
1101 3   637804.225  1941761.966   619.203 HV 01
1102 3   639929.744  1936476.153   580.950 HV02
1103 3   640264.951  1936497.219   568.860 HV03
1113 3   637971.142  1941872.520   677.595 HV 13
1114 3   637661.055  1941542.571   642.833 HV 14
1138 1   637883.236  1941647.108   615.571 V 50

XXXXXXXXAAAAAAAXIXFFFFFFFFFFFFFXFFFFFFFFFFFFFXFFFFFFFFFFXAAAAAAAAAAAAA   VARIABLE FIELDS

WHERE      X = SPACE
A = ALPHA-NUMERIC CHARACTER
I = INTERGER NUMBER
F = REAL NUMBER CHARACTER
```

Open the control file (*.GPE*) in a text editor so that the data is viewable. Delete the first three lines. All photo center points (code 9) are listed at the top of the file. Delete the code 9 points. Only ground control and analytical points (codes 0 through 4) will remain.

A typical FORTRAN statement for the above would read:
(8X,A6,1X,I1,2(1X,F12.3),1X,F9.3)

STATEMENT	**DEFINES**
8X	Skip the first 8 spaces
A6	Read the next 6 alpha-numeric characters for the **POINT ID**
1X	Skip one space
I1	Read one integer number for the control **CODE**
2(1X,F12.3)	This statement will read in the **"Y"** and **"X"** coordinates. Skip one space, then Read 12 real number characters (3 of the 12 reserved for decimal values) for the **"Y"** value and then repeat for the **"X"** values.
1X	Skip one space
F9.3	Read 9 real number characters (3 of the 9 reserved for decimal values) **"Z"** value
1X	Skip one space
A10	Read the next 10 alpha-numeric characters for the **LABEL**

If you have any questions loading control to a stereo plotter, please send email to:
Brad.Buller@dot.ca.gov

Using Caltrans Place Point Macro for MicroStation

Caltrans created a MicroStation Macro to automate the task of placing control points and photo centers when creating topographic CADD files from Photogrammetric mapping. The place point macro will ONLY work with Caltrans' new control file format (*.GPE*) and Caltrans' cell library called *mgeo.cel*. The macro will do the following: ·

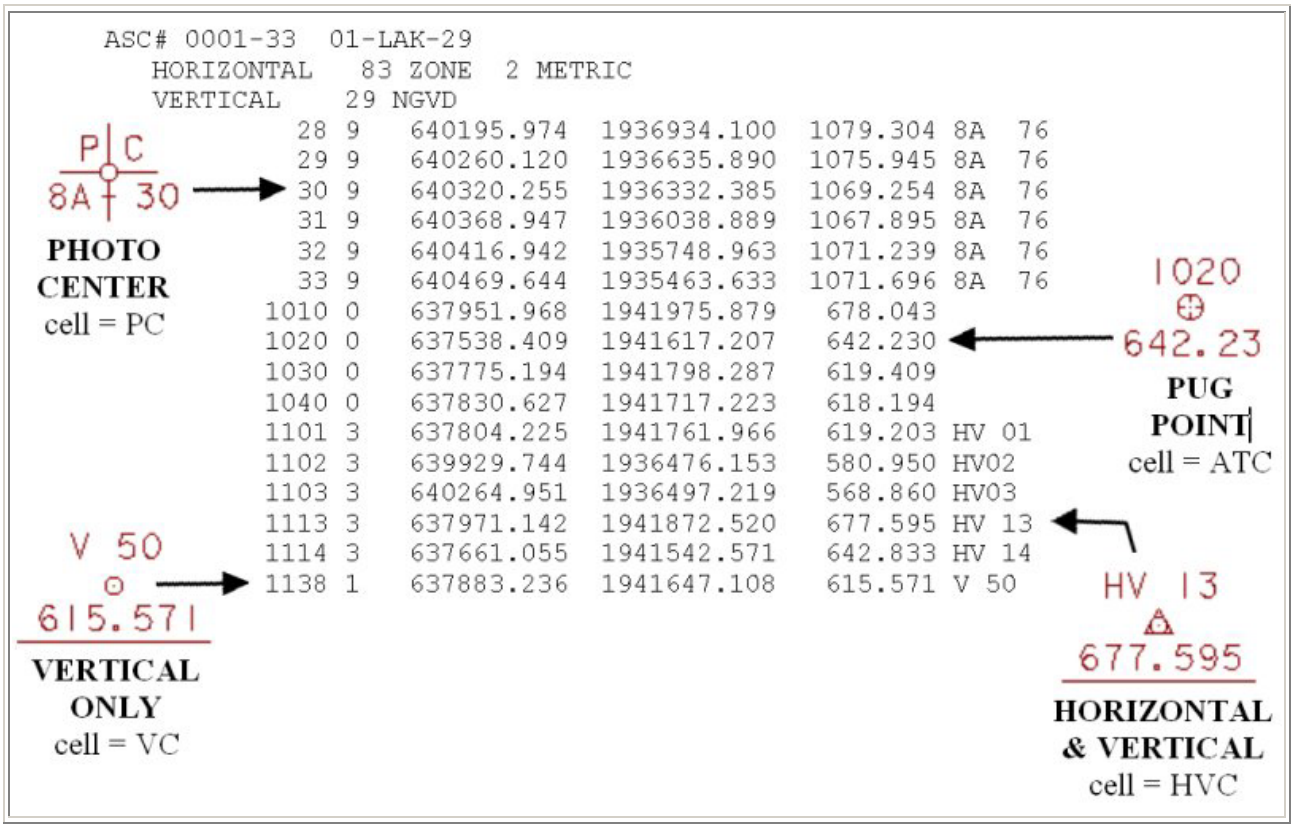
Reads the control file data. ·
Determines the type of cell needed. ·
Place the cell at it's XYZ position. ·
Fill the Data Field with the appropriate text label.

The name of this macro is *placpnt.bas*. It has been added to the Mapping Standards and Resource Files that can be downloaded from the internet at:
http://www.dot.ca.gov/hq/esc/photogrammetry/resources0504.exe

Tip 1
MicroStation comes loaded with several sample macros. When you download this macro, you can put it with the others so that the default path will automatically come up when you want to run it. Try to find the sample macros on your computer and put placpnt.bas in the same directory. For example:
C:\win32app\ustation\macros
How to use the place point macro:
Open a new MicroStation file (metric seed) and set the proper design plane global origin.
Go to: **Utilities > Macro.** When the macro window opens, select *placpnt.bas*. If you do not see it, select **Browse** and set the path to the proper directory.
Click **Run**. An input window will open and ask for the source *.GPE* data (control file).
Set the path to the control file and click **OK**.
Done. A report window appears indicating how many points were placed . If you do not see them, try **Fit View** and update the screen.

Tip 2
The first time you do this, all cells will be orientated to North. Look at the photo center points along the flight path and construct a line that represents the average direction of flight. Measure the angle of that line. Delete the original points or create a new file, but this time set your Active Angle to that of the flight line before running the macro. Now when the points are placed, they will be properly orientated along the flight line and should read left to right as the photo centers increase along the route. On some long mapping projects, there may be several flight lines and the procedure may be repeated for each flight line.

Four Examples of Cells Created by Place Point Macro



If you have any questions regarding using the place point macro, please send email to Scott.Rodrick@dot.ca.gov